



Prevalence of Diabetes Mellitus Type 1 among Children in Majma'ah Primary Schools, 2017

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General Note

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ABSTRACT

Background: Diabetes Mellitus is one of the most common chronic metabolic disorders that have huge impact on health of patients, consequences on the social life and economic burden on countries. There is no permanent cure for the type 1 diabetes mellitus up to this time. As there is serious short-term and long-term implications and huge consequences on the government there should be steps towards educating the community to minimize the impacts. To improve quality of life diabetic children have during school or outside the school there must be education about the disease and the ways it's managed to reduce or prevent complications.

Diabetic ketoacidosis is a life threatening condition that has been increasing and this could be contributed to the lack of awareness about the presentation of diabetes. We need to increase the education about the disease and the ways it is managed to reduce or prevent such complication. *Methodology:* This is a cross-sectional study conducted between April 2017-June 2017 to measure the prevalence of diabetes mellitus type 1 among children in Majma'ah primary schools. It involves pre-tested, pre-coded, questionnaire which was analyzed by using the SPSS version 23. *Results:* A high prevalence of diabetes was shown in the primary schools of Majma'ah 2017 with combined shortage of medical services provided during school hours. 83% of schools have no health care units and 94% of teachers were aware about diabetes. *Conclusion:* There is high prevalence of type 1 diabetes mellitus among the primary school children, and most of the teachers were aware of the disease and its symptoms. Appropriate programs and healthcare services needed to be introduced in the schools to achieve the maximum care to diabetic children. *Recommendation:* There should be an integration between the school and Ministry of Health and Ministry of Education to improve the health care services in the schools and prepare courses to the teachers to increase their awareness regarding type 1 DM.

Keywords: Diabetes mellitus type 1, awareness, children, primary school, Majma'ah, Saudi Arabia

1. INTRODUCTION

Type 1 diabetes mellitus is one of the most prevalent chronic diseases in children in current time and one of metabolic disorders causing multiple complications if not managed (Karim A et al., 2000; Bénédicte and Peter, 2015). Diabetic children spend almost 6 to 7 hours in the school which require providing a good care of them during this time, and this include monitoring blood glucose, insulin administration, managing low blood glucose if necessary and providing a good diet care (Bénédicte and Peter, 2015). Although special care is needed for diabetic children many obstacles could face this care including poor diet programs, lack of nurse in the school and lack of staff training in dealing with emergencies (Bénédicte and Peter, 2015).

In the current data, the predicted prevalence of diabetes in all age groups is estimated to increase from 171 million in 2000 to 366 million in 2030 (Wild S et al., 2004). According to IDF Diabetes Atlas, the incidence of diabetes in the population under 15 years is increasing every year worldwide (Cho N et al., 2017). It found that more than 96,000 who are under 15 years are diagnosed with type 1 DM every year globally where USA, India and Brazil are found to have the largest incidence among other countries (Cho N et al., 2017). Saudi Arabia, comes at the 8th place worldwide by 2,800 new cases of type 1 DM every year in <15 years population (Cho N et al., 2017). Furthermore, the incidence in Saudi Arabia is estimated to be 35,000 cases in 2017 for type 1 diabetes mellitus in under 15 years population (Cho N et al., 2017).

Although there are limited number of epidemiological studies in KSA assessing the prevalence of type 1 DM. One study was conducted in Al-Qassim Region from July 2009 to March 2010 and found the prevalence of type 1 DM among adolescents and children is 109.5 per 100,000. Also it shows that the highest prevalence by region of diabetes mellitus types 1 in Saudi Arabia was in the central region, and eastern region was the lowest (Al-Herbish AS et al., 2008). Long-term of uncontrolled type 1 diabetes result in multisystem impact starting from diabetic ketoacidosis and hypoglycemic coma which lead to death if not managed and reaching to chronic impact on kidneys, eyes and the cardiovascular system of the child (Karim A et al., 2000; Wild S et al., 2004). This converts the problem from primary care to tertiary care and lead to a burden on health care which can be prevented (Karim A et al., 2000; Wild S et al., 2004).

Type 1 diabetes mellitus requires a special healthcare inside and outside the school as it is a 'concealed disability'. Diabetic children need to be recognized to the school to make sure about their safety and that the medical needs are met (Bénédicte and Peter, 2015). In addition, the age of the young adult does not prevent ketosis, hypoglycemia or emergencies related to diabetes during school hours, thus all children and young people who have diabetes must have a care plan for school. Where great control is achieved at the home, diabetes care may be weakened in the school, putting the child's long and short-term diabetes management at increased risk (Bénédicte and Peter, 2015). Teachers awareness, type of food introduced to diabetic children and management of complications are important aspects in preventing type 1 diabetes mellitus complications (Bénédicte and Peter, 2015).

This study aims to assess prevalence of type 1 DM in the schools of Majma'ah city and to evaluate teacher's awareness in the critical situations of diabetic patients and to investigate the type of care given for these patients at school. Research general objective is to measure the prevalence of diabetes mellitus type 1 among children in Majma'ah primary school. Specific objectives are to assess the type of food introduced into cafeteria, assess the extent of awareness of the teacher and children about the disease and to determine health care provided to diabetic students.

Literature review

Diabetes Mellitus is one of the most common chronic metabolic disorders that have huge impact on the health of patients, consequences on the social life and economic burden on countries (Kirti Kaul et al., 2012). Diabetes Mellitus type 1 account for 5 percent to 10 percent of all known cases of diabetes (Daneman, 2006). Genetic, autoimmune and environmental factors are involved in the development of this type of diabetes (Kell, 2009). Main features of diabetes type 1 include increased thirst, polyuria, increase appetite and weight loss (Kell, 2009). There is no permanent cure for the type 1 diabetes mellitus up to this time, as there are serious short-term and long-term implications and huge consequences on the government there should be steps towards educating the community to minimize the impacts (Al-Herbish et al., 2008).

To improve the quality of life diabetic children have during school or outside the school, there must be education about the disease and the ways it's managed to reduce or prevent complications (Couch R et al., 2008). Below 15 year old, 80000 children are predicted to have type 1 diabetes each year worldwide (Craig et al., 2014). Generally, between 10 to 14 years the incidence rate raises and it appears to be steady between 15 to 29 years. In US diabetes type 1 prevalence by age 18 years showed to be almost 1 in 300 children (David et al., 2010). A study conducted in Kuwait about Prevalence of Type 1 Diabetes among 6- to 18-Year-Old Kuwaiti Children reported that 269.9 per 100,000 children were diabetic (Moussa et al., 2005).

In comparison with other countries, Saudi Arabia (SA) has limited number of researches and studies assessing the prevalence of T1DM. A study conducted in Saudi Arabia between 2001-2007 showed that prevalence rate was 109.5 per 100,000 individuals; the central area of SA has the highest prevalence rate (Al-Herbish et al., 2008). Many studies in Saudi Arabia shows poor glycemic control in Saudi diabetic children and adolescents, and that the prevalence of DKA is highly increasing (Sayed et al., 2017; Adnan et al., 2016; Cherian et al., 2010). Another study in Saudi Arabia showed that diabetic children and adolescent had poor glycemic control, and only 15.6% of children, and 12.4% of adolescent were having a good glycemic control according to the study (Adnan et al., 2016). Diabetic ketoacidosis is a life-threatening condition that has been increasing, this could be contributed to the lack of awareness about the presentation of diabetes, and this is an alarming sign that needed serious interventions to educate the society (Sayed et al., 2017; Adnan et al., 2016; Cherian P et al., 2010).

Diabetes has a huge burden on the healthcare systems in the countries (Wenya et al., 2012). A study in KSA conducted by Alhawaish in 2013 showed that the cost of healthcare provided to diabetic children below 15 years old is 9 times greater than the expenditures of non-diabetic children of the same age (Abdulkarim et al., 2013). Since children spend an average of seven hours a day at school, it is one of the school's responsibilities to provide a supportive environment and to handle any diabetes-related challenges that might arise during the school day and at school activities to prevent the diabetes complications or to delay it (Diabetes Care, 2010). The responsibility starts with blood glucose checks, Insulin administration, provide meals and snacks and schedule physical activity and looking for any signs or symptoms of hypo/hyperglycemia (Abdulrahman et al., 2018). Unfortunately, studies have shown that school personnel have learned a little about type1 DM and how to deal with emergency situations (Diabetes Care, 2010; Abdulrahman et al., 2018; Siminerio and Koerbel, 2000). As in study done in Serbia to identify issues in the management of diabetic children at school, they found that 2.7% of children and 3.3% of adolescents had severe hypoglycemia while in school, and a huge number of the teachers don't have enough knowledge about diabetes (Jesić et al., 2016). Therefore, there must be an education program for all the school's staff as well as the students in order to support the implementation of a child's diabetes management plan and to deal with emergency cases (Siminerio and Koerbel, 2000).

2. RESEARCH METHODOLOGY

Materials and Methods

In this research, the study designed to be descriptive cross-sectional survey-based in Majma'ah primary school at Majma'ah city, the sampling technique was convenience sampling; a questionnaire was distributed to the teachers and diabetic student advisors.

Study Area/Setting

The study was conducted in Majma'ah primary schools at AlMajma'ah city in three months (from 6th April -8th June 2017). Majma'ah city is located in Riyadh area north of Riyadh city, it has an area of 30,000 square kilometers 45,000 population. There are 269 schools including primary, intermediate and secondary schools (127 schools for boys, 142 for girls). The total students in primary schools are 13137 (6686 boys - 6451 girls), in age of 6 -12 years ranging from first to sixth grade.

Study Subjects

Inclusion criteria: Diabetic children in primary schools at Majma'ah city.

Exclusion criteria: Non Saudi residents and disabled.

Study Design

The study will be descriptive cross-sectional survey-based study.

Sample Size

The Sample size of this cross-sectional study was determined by using online statistical calculator software (Raosoft®, Inc). A sample size of 251 teachers was calculated to achieve a 95% confidence interval with a margin of error of 6.15%. At the primary schools there were 300 students in total, only diabetic students were included.

Sampling Technique

Schools in Majma'ah city were listed and 50% of them were selected randomly, the data of the students was gathered in two ways: as in some schools there is a health unit, so the information was taken from its records, while in other schools who does not have health unit, the data was taken from the students' files.

Data Collection methods, instruments used, measurements

A questionnaire was made by us as research group and it was validated by our supervisor then we did pilot study about the diabetic students. A questionnaire about the students was filled by the researcher and the informers were the student advisors. The questionnaire contains two parts, first section for measuring socio demographic data, while the second one for the dietary habits and exercise of the diabetic student at the school.

The second surveys have been given to the teachers with a clear description of the study and its objectives and they have been asked for their consent. Teachers who agreed to participate were interviewed by one of the researchers to ensure that all questions are clear and comprehensive. The questionnaire contains questions to measure the awareness of the teachers about type 1 diabetes mellitus and its emergencies and how to intervene.

Data management and analyses

Data was managed and analyzed by Statistical Package for the Social Sciences (SPSS) version 20.

Ethical Consideration

Permission from the education authority was insured (number: 38787467). Confidentiality, respect and dignity maintained throughout the research process.

3. RESULTS

The prevalence of type 1 diabetes mellitus among primary schools children was 5 for each 1000 child. Of 23 primary schools in Majma'ah, 19 schools have no healthcare units, and only 4 schools were providing healthcare service (Fig.1).

We found that majority of the diabetic children (53.3%, n=8) were receiving unhealthy food in the school, 13.3% (n=2) of children were receiving a healthy food and 33% (n=5) brought their food from home. Regarding teachers' awareness to the diabetes, Table 1 describes the findings in details.

Table 1 Level of awareness of DM among teachers in primary schools in AlMajma'ah, 2017

Level of awareness	frequency	%
Aware	236	94
Not aware	15	6
Teacher defines DM1 with:		
High level of glucose	141	56.2
Low level of glucose	6	2.4

Both	40	15.9
Different definition	49	19.5

Regarding teachers' awareness of emergency interventions for diabetes mellitus, Table 2 describes the findings in details.

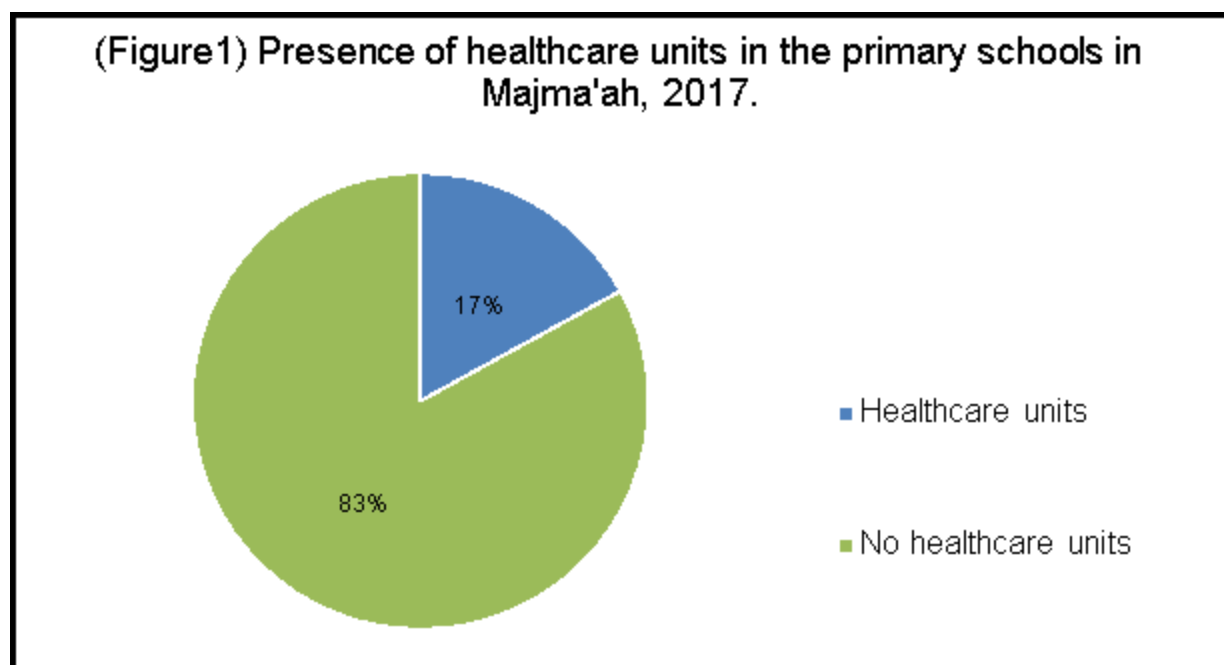


Table 2 Awareness of emergency interventions for DM among the teachers in primary schools in AlMajma'ah, 2017

Awareness of emergency intervention	Frequency	%
Aware	194	77.3
Not aware	57	22.7

4. DISCUSSION

A high prevalence of diabetes was shown in the primary schools of Majma'ah 2017 with combined shortage of medical services provided during school hours. Also, not all the teachers were aware in the first aid of diabetes medical emergencies. This suggests that most of diabetic children are not getting the standard care during the school hours. This study assessed the prevalence of type 1 diabetes in Majma'ah primary schools and provided a look on the care given to them showing significant prevalence by 50 out of 1000,000 (5 out of 1000). Compared to worldwide prevalence which predicted that diabetes for all age-groups was 2.8% in 2000 and 4.4% in 2030. The prevalence of diabetes is estimated to increase from 171 million in 2000 to 366 million in 2030. It is believed that the prevalence of diabetes is higher among male than female. However, the prevalence of diabetes is more common in developing nation. The most important demographic change to diabetes prevalence across the world appears to be the increase in the proportion of people >65 years of age (Al-Herbish et al., 2008). Also, worldwide, type 1 diabetes is predicted to be more than 79,000 child (Bénédicte and Peter, 2015). In Kuwait, one study determined the prevalence of type 1 DM among 6-18 years Kuwaiti kids to be 269.9 per 100,000 (Moussa et al., 2005). So, Majma'ah city is considered to have high prevalence compared to the result in Kuwait country. Many of schools did not have a health care unit which provide care services for diabetic students as in Majma'ah city.

Regarding the awareness about the disease it was more superior in primary schools of AlMajma'ah city comparing to the another study that was conducted in in Jeddah which showed that there is less information known about uncontrolled hyperglycemia risk factors and levels of sugar control among Saudi children who have type 1 diabetes mellitus (Abdulkarim et al., 2013). This study suggests that health care system inside the schools involving the diet provided doesn't consider the primary prevention of complications that can affect the diabetic children. It looks a major problem in the schools which is not supported by other studies in the kingdom. Further more, data collection should have implemented a faster way by sending the surveys online even if this problem won't affected the results of the data. Since the high prevalence of diabetes type 1 among primary school students. There should a strong move supporting the health care provided to them during the school hours. Also, We suggest more studies to assess this issue further.

5. CONCLUSION

Type 1 diabetes has a huge impact on the health of the patients, healthcare systems and economic burden on the country. Controlling diabetes is more efficient and less costly than treating the complications. Appropriate programs and healthcare services needed to be introduced in the schools to achieve the maximum care to diabetic children.

Recommendation

The Health care services in the schools should be improved and supported from the Ministry of Health and Ministry of Education to provide maximum care to diabetic students and to increase the awareness of DM and its symptoms among teachers.

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Competing interest

No any conflict interest among authors.

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